THE INCISORS OF *SCEPARNODON.*

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(Plate xxii.)

The haze of ignorance still shrouding the origin of the teeth we call *Sceparnodon* would be lightly lifted if only we could opine with the author of Pt. 5 of the British Museum Catalogue of Fossil Mammals, that they grew in the upper jaw of *Phascolonus*. But even in the realm of the undemonstrable it would be well that an explanation to be projected thence should not wholly ignore the fact, intimated by Owen, that these teeth are not all the same teeth; well, also, that it should not, in the act of associating them with any mammal whatever, raise a crop of difficulties for other explanations to eradicate. To a waiter on reliable means of judgment it has now become evident that any attempt to refer these teeth to an animal whose lower incisor is known must end in disaster. In other words, it is patent that the teeth in our collections are not all, as they are assumed to be, upper incisors, but that they include the teeth from both jaws of the otherwise unknown animal. Though the assertion is a bold one, it is made with the diffidence which arises, not from any weakness in the evidence, but from the reflection that the means of distinguishing one tooth from the other has always been in view of keen and practised eyes yet has never been recognised. Turning to Plate 11 of the Philosophical Transactions of London for 1884, and comparing fig. 5 with fig. 7, we observe that the length of the working surface in fig. 7, though diminished by the absence of somewhat

more than the cutting edge, is very much greater than, in fact nearly twice as great as, that of fig. 5. We are not at liberty to attribute so great a difference to the accidents of function in two individuals or to specific differentiation until we have failed to explain it by reference to any known rule applicable to the case, and such a rule we find maintained in the conditions of the working surfaces by all marsupial herbivores having procumbent incisors in the lower jaw; in these the long slope of the lower tooth working with reciprocating action across the comparatively vertical edge of the upper suffers abrasion to the extent of its motion. Seen in this light, the significance of the relative lengths of the surfaces of abrasion in the teeth figured becomes great, and it points to no other interpretation so likely to be correct as this, that they are due to the interaction of opposed teeth. The inferiority in the width of the tooth, which from this point of view is the upper, affords no ground of objection since this is simply a sign of immaturity; the tooth is, as Owen rightly inferred from its shape, in course of growth. On the supposition then that this identification of the lower incisor is admissible, the long mid-rib on its concave side, in which its describer is disposed to see an indication of specific difference, becomes merely an item, but an important one, in its diagnosis.

So far we have deduced all we can, and all that is really necessary, from the only figures of the teeth extant, and very probably it is not enough to make good our contention. But evidence in reserve shows, first, that the subject of fig. 5 is really an upper tooth; secondly, that the characters presented by fig. 7, length of working surface, the longitudinal rib, even a peculiarity in the depression marked *b* are constant, and, therefore, as to this tooth, we shall have to choose between the probability of its being the lower tooth of *S. ramsayi*, and the improbability that it is from a

second species whose upper tooth is constantly abraded to an extraordinary degree, the lower tooth in both species being unknown.

The Queensland Museum possesses a perfect adult incisor of large size (Pl. xxii. fig. 1); that this is, without shadow of doubt, an upper tooth is certified by the presence of the premaxillary bone which encases it to a distance of 41 mm. from its outlet, and re-appears distad as a smaller adherent portion from the root end of the socket. In passing it may be noted that the outer edge of the premaxilla, commencing near the outlet, folds over inwards and downwards, also that its inner edge (17 mm. in length) is smooth and entire, showing no sign of sutural union with its fellow, both features foreign to the near kindred of *Phascolonus*. The working surface of this tooth has the same general length as that in Owen's fig. 5, namely, 13·5 mm. The entire breadth of the tooth being 40 mm., or three-eighths greater than that of its younger type, we may gather that the working surface did not, on the whole, lengthen with age, a fact directly opposed to the assumption that the elongately worn teeth are from the same seat of growth, and at the same time rather discouraging than otherwise any suspicion that they may have belonged to another species. On the concave side of this tooth there is not the slightest trace of a median longitudinal ridge. Assuming for a moment that the subject of fig. 7 is a cast of a lower tooth, its breadth, 35 mm., is fairly proportionate to that from the upper jaw, 40 mm.

The upper tooth being ascertained and its characters definable, we have to account for those *Sceparnodon* incisors which are not at all in accordance with it. And here the writer must take leave to confess that, until the last piece of evidence fell into his hands, he, relying on authority, failed to appreciate the differential characters of the teeth and casts under his own observation. His attention to the matter was aroused by the appearance of the

small tooth shown in Pl. xxii. fig. 2, a tooth in a much less advanced stage of growth than that of Owen's fig. 5, and so distinctly different from the adult tooth now figured as to excite a doubt in his own mind as to their specific co-identity. The doubt vanished as soon as the relative extents of their working surfaces suggested community of causation between them and similar effects elsewhere. The length of this surface in the young tooth is 31 mm., more than twice its length in the adult upper tooth, but considerably less than in the adult lower tooth represented by Owen, fig. 7. But the breadth of the tooth itself at the fore end is but 16 mm. against 35 mm. in the type adult, so that its working surface is even longer in proportion to its width than in the adult state. The identity of this tooth with Owen's subject, fig. 7, is established by the presence of the longitudinal rib, and the constancy of this character again is deduced from a third appearance of it in Owen's fig. 2. In the depression *b* of fig. 7, and of Pl. xxii. fig. 2, *infra*, we have a proof of equal persistency. One side of the abraded surface (the left) sends backwards, as is shown in the figures, a tapering tongue which ends in a point depressed in the outer edge of this face of the tooth, and more than half of the surface of wear on the inner side loses its smooth flat character posteriorly and becomes a coarsely roughened depression which in the young tooth is seen to be caused by the direct chopping impact of the sharp edge of the upper tooth on its surface, in which it has cut distinct notches. A similar depression, accompanying a lateral tongue of abraded surface on the opposite side, occurs in the immature upper tooth as figured by Owen, but the depression there is small, smooth and limited to the edge; the surface, moreover, has no trace of incisive action behind the regular surface of wear. There are thus three features constantly present in these teeth which are absent from the others, and one of these features, an extended area of abrasion, is normal to the lower incisors of other marsupials. The differently conditioned teeth prove to be upper teeth. The plain

inference is that their companions are the corresponding lower teeth.

The inference can only be evaded by attributing them to another species. To effect this we shall have to suppose either that we know only the upper teeth of one species and the lower of another, a supposition which its responsible originator will have to recommend by the doctrine of chances, or that the second species had abnormally long working surfaces on its upper incisors and correspondingly enormous elongations of those surfaces on the lower incisors. The probability of this condition of things it is hardly necessary to discuss.

It must be concluded that both the upper and lower incisors of *Sceparnodon* are known, and, consequently, that *Sceparnodon* is not a synonym of *Phascolonus*.

EXPLANATION OF PLATE XXII.

Sceparnodon ramsayi, Ow.

Fig. 1.—Right upper incisor, adult.

Fig. 2.—Right lower incisor, young.